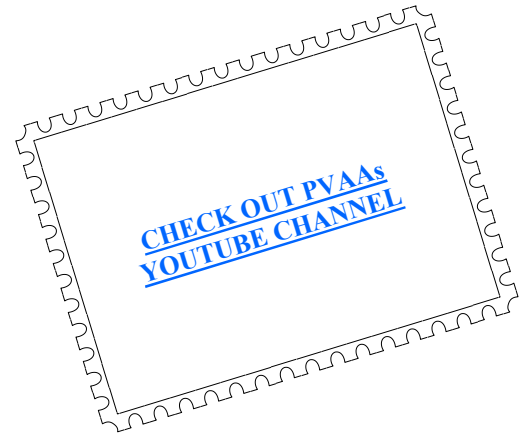




Newsletter of the Pomona Valley Amateur Astronomers

It is the stars, the stars above us, govern our conditions.  
*William Shakespeare*



Volume 43 Number 10

*nightwatch*

October 2023

### President's Message

October has always been a prime stargazing season for me. I bought my first telescope in October of 2007, and the constellations that were rising in the eastern sky just after dark -- Cassiopeia, Perseus, and Taurus most prominently -- have always been my celestial 'home base'. And if you push very late at all, you're treated to the sight of Orion and its neighbors coming up, and the many bright jewels of the winter Milky Way.

It's a good season for planets, too. Jupiter will be at opposition on November 3, and Uranus on November 13, so they'll be up all night and at their brightest. Uranus doesn't show much detail, even in monster telescopes, but on the other hand it's not hard to track down. Even small telescopes or large binoculars should show it as a distinctly bluish "star".

A fun exercise to do with Jupiter is to plot the positions of the four Galilean moons for a couple of weeks, and work out which is which by reconstructing their orbits. If you need a trick to remember the names of the "Big Four" moons, in order outward from Jupiter, the vowels come before consonants, and then reverse alphabetical order within each set: Io, Europa, Ganymede, Callisto.

Our next general meeting is 7:30 PM this Friday, Oct. 27, in Shanahan B460 on the Harvey Mudd campus. Our speaker is our own Dr. Joann Eisberg, Professor of Astronomy at Chaffey College, who will speak on, "A Ruler to Measure the Universe -- Henrietta Leavitt, Cepheid Stars and the Magellanic Clouds". Dr. Eisberg always gives great talks, so come on out and prepare to be entertained and illuminated.

*Matt Wedel*

### Club Events Calendar

**Oct 27**      **General Meeting In Person and on Zoom**  
                  **–Joann Eisberg " A Ruler to Measure the Universe**  
                  **Henrietta Leavitt, Cepheid Stars and the Magellanic**  
                  **Clouds"- 7:30pm**

**Nov 8**            **Board Meeting 6:15 PM**  
**Nov 9-12**      **Nightfall**      [www.NightfallStarParty.com](http://www.NightfallStarParty.com)  
**Nov 17**        **General Meeting – 7:30pm**  
**Nov 18**        **Star Party – GMARS**  
**Nov 29**        **Board Meeting 6:15 PM**

**----NOTE THE CHANGE----**

**Dec 2**            **Holiday Party - Casa Jimenez - 6:00 PM**

### PVAA General Meeting 9/29/23

This was our second live post-COVID meeting in room B460 of the Shanahan building at Harvey Mudd College. Our speaker for the night was our own Ken Elchert on “Rings, Resonances, and the Roche Limit”. We did have a little problem at first getting the screen sharing correct, but it was quickly fixed.

Ken brought up a little-known fact that 11 objects in our solar system are known to have rings: The Sun has dust rings, the Asteroid Belt, and the Kuiper Belt. Jupiter has 4 rings, Saturn has 7 highly visible rings, while Uranus and Neptune have 13 rings and 5 rings respectively. Two Kuiper Belt Objects – 136108 Haumea has 1 ring, and 50000 Quaoar 2 rings. Two minor planets between Jupiter and Neptune have rings: 10199 Chariklo has 2 rings, and it is the smallest object known to have rings. 2060 Chiron aka 95P Chiron – identified as both a minor planet and a comet has rings that have yet to be confirmed.

Ken came up with 4 different ways for ring formation. The first theory is that the rings are made up from material left over from the planets’ moon formation. The second theory is that a secondary body wandered inside the Roche limit and was pulled apart by tidal forces, forming a ring around the planet. Theory 2b is that the matter came from eruptions from the secondary body (ice vents & volcanoes, etc.) which formed rings around the primary object. Theory 3 is the primary body erupted and the material formed rings around the primary or secondary body. The last idea is that an asteroid or comet impacted the primary or secondary body, creating the rings.

Edouard Roche is a mathematician that came up with the Roche Limit that is the distance from a celestial body that another celestial body can get without breaking up. If a small moon was spiraling in towards a planet, then eventually the planet’s gravity would be stronger on the moon than the moon’s, causing it to break apart. Three moons in our solar system are close to the Roche Limit: Metis and Adrastea of Jupiter, and Neptune’s Naiad. Mars moon Phobos will break up in 30 to 40 million years.

Ken then talked about the resonances of the planets, moons, and rings. He then went on to talk about the asteroid Psyche, which is not a rubble pile but a solid mass of several heavy metals. The value of the asteroid’s metals is estimated to be 10,000 quadrillion dollars. Psyche alone is about 1% of the mass of the asteroid belt. The Psyche spacecraft launched on a Falcon Heavy rocket on Friday, October 13, 2023, and will reach the asteroid in August 2029. The European Space Agency built and launched the JUICE (Jupiter ICy moons Explorer) mission.

#### Examples of Rubble Pile Asteroids



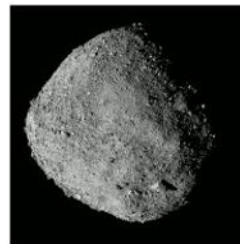
**Itokawa**  
Visited by the Hayabusa spacecraft in 2005 -7



**Dimorphos**  
Impacted by the DART spacecraft on Sept. 26, 2022



**Ryugu**  
Visited by the Hayabusa2 spacecraft in 2018 -9



**Bennu**  
Visited by the OSIRIS -REx spacecraft in 2018 -21

OSIRIS-REx returned with its sample to Earth on [Sept/ 24, 2023](#)

JUICE launched April 14, 2023, on an Ariane 5 rocket, and will arrive in December 2034. It will be examining Jupiter, Ganymede, Callisto, and Europa. Scheduled for October 10, 2024, NASA will launch the Europa Clipper spacecraft on a Falcon Heavy, arriving April 11, 2030. While the spacecraft will be in an elliptical orbit around Jupiter, it is scheduled to make 44 close flybys of Europa.

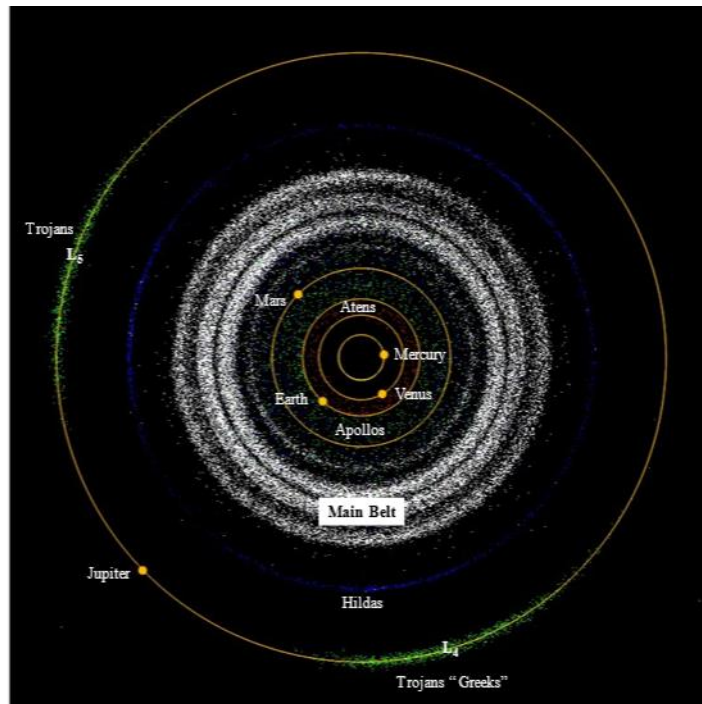
Ken then went over the resonances of Saturn and Neptune, followed by a Q & A session. You can view the presentation and the Q & A session on our YouTube channel. This is the link to Ken's presentation: <https://www.youtube.com/watch?v=ofisRuPlrE4>

Our YouTube channel is: <https://www.youtube.com/@pomonalleyamateurastrono656>

Gary Thompson

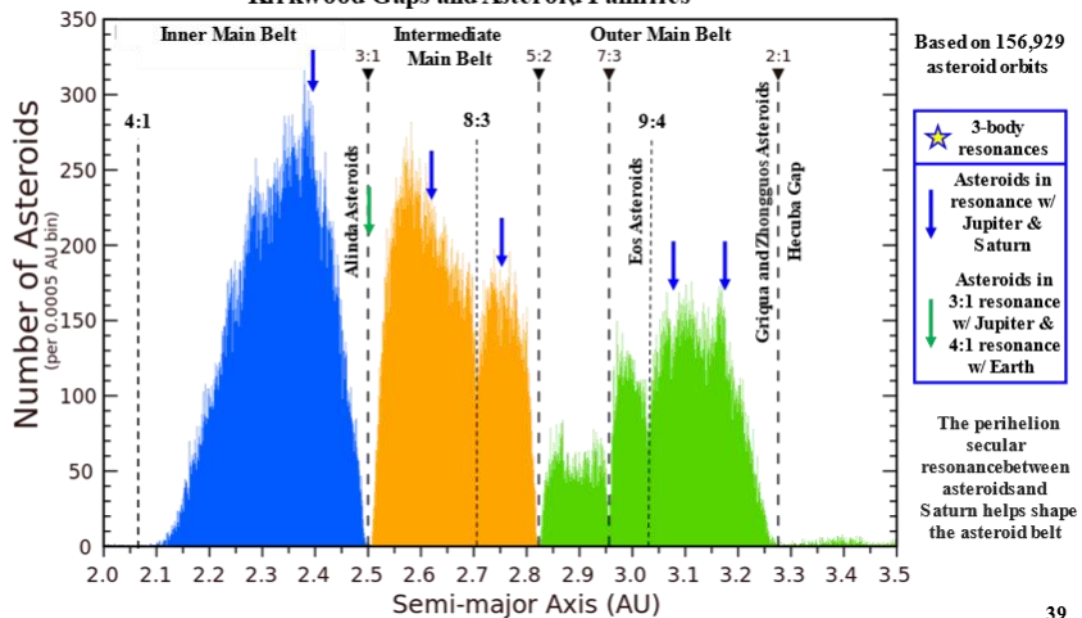
A plot of inner solar system asteroids and planets as of 2006 May 9, in a manner that exposes the Kirkwood gaps. All object position vectors have been normalized to the length of the object's semi-major axis.

There are 1,299,220 known asteroids, KBO's TNOs and dwarf planets in the solar system



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### Asteroid Distribution in the Main Asteroid Belt - Kirkwood Gaps and Asteroid Families



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## Lobster Claw and Bubble Nebulae

As mentioned last month, there was no camping this month for two reasons. First, college football season started and the second home game conflicted with new moon weekend. Then, it was Cindy's turn to get COVID, so we wouldn't have been able to go camping anyway! We had good weather toward the end of August and the first week of September, then "June" weather moved in again with overnight and morning clouds. I was hoping to get more time on the second image, but ... weather!!



Since imaging was done from home, and the targets were primarily emission nebulae, narrowband filters were used for data collection. First up is SH2-157, also known as the Lobster Claw Nebula, located in Cassiopeia near its border with Cepheus. The nebula lies about 11,000 light years from Earth and is circumpolar, meaning it never sets, but currently is at its highest elevation in the late evenings. Most of the glow of the nebula is from excited hydrogen, but there is a large blue emission region relatively rich in oxygen in the pincer part of the claw. In addition to the nebula, a star cluster can be seen about 1/3 of the way between the upper right corner and the center of the image. This cluster is NGC 7510 located in Cepheus about 11,500 light years distant and estimated to be about 10 million years old. Finally, between the Claw's pincers, near the center of the left one, is a small cluster of stars, Markarian 50, with four of them in the shape of a diamond. Above the diamond shape is the brightest star in this small cluster, WR-175, a Wolf-Rayet star, burning at 65000K (177,000°F). Hotter than most stars, Wolf-Rayet stars have depleted their hydrogen and are burning helium or even heavier elements. Markarian 50 lies about 11,300 light years away.

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Next up, near the Lobster Claw Nebula is the Bubble Nebula, NGC 7635 or SH2-162. I shot the Lobster Claw with north up, my usual framing, however, if the camera is rotated about 45°, both nebulae can be placed within one frame. In this picture, the Lobster Claw extends toward the center of the image from the bottom right corner, and the Bubble lies midway along, and somewhat inward, of the left edge. Like the Lobster Claw, the Bubble also lies in Cassiopeia some 7,000 to 11,000 light years away, though perhaps slightly closer. Unlike planetary nebulae, which it resembles, the Bubble is formed by strong stellar winds emanating from a young, magnitude 8.7 star that is about 44 times the size of the sun. The stellar wind plows into the molecular cloud forming the spherical feature of the Bubble. SH2-159 is the small nebula above and between the pincers of the Lobster Claw and the Bubble. This small nebula is also located about the same distance as the other two nebulae making this region very dense with glowing gas from the molecular cloud. Finally, creeping in at the upper left corner is LBN 547, a very large, faint emission nebula.

Both images were obtained using a StellarVue SVR90T telescope equipped with a 0.8x focal reducer operating at 488mm focal length and a ZWO1600MMcool camera cooled to -15C. An Optec FocusLynx automatic focuser was used to keep the images in focus by refocusing whenever the stars increased in size by more than 5%. Typically, refocus occurred 3-6 times over the course of a single night, depending on how much the ambient temperature dropped. The mount was dithered (slightly moved) every 4 frames to help randomize noise and assist in bad pixel rejection.

Both images are SHO (sulfur/hydrogen/oxygen) Hubble palette images shot through Astrodon 5nm filters. The Lobster Claw image is a composite of 51 frames through the sulfur filter, 49 frames through the hydrogen filter, and 93 frames through the oxygen filter, while the Bubble image is a composite of 30 frames through the sulfur filter, 33 frames through the hydrogen filter, and 61 frames through the oxygen filter. All individual frames were unguided exposures of 600 seconds (10 minutes) and were calibrated with 21 dark, 21 flat, and 21 flat dark frames. Since oxygen frames are usually noisier than the other frames, roughly twice as many were taken. The Lobster Claw has a total integration time of over 32 hours collected from August 23-27. The Bubble has a total integration time of just under 21 hours collected from September 6-8.

Processing for both images was similar and done mostly in PixInsight with some color adjustments done in Photoshop. After integration of the individual frames, the hydrogen and oxygen stacks were normalized using the integrated sulfur stack as a reference, then combined by mapping sulfur to red, hydrogen to green, and oxygen to blue. Normalization helped to balance the three colors since the hydrogen signal was very strong compared to the sulfur signal. Next, a pass of noise reduction was done followed by removal of color gradients. At that point, the stars were removed and processed separately. Slight stretching of the stars (brightening) was done using an arcsinh curve function with care taken to prevent them from becoming bloated and saturated or pure white. The star image was color inverted, green was removed, and the image reinverted. The result of this was to remove the magenta color cast that exists in the stars of narrowband images. Then, the starless image was stretched iteratively while focusing on specific portions of the image for enhancement using several generalized hyperbolic functions. Faint details were enhanced while preventing the brighter portions of the image from becoming washed out. Once suitably stretched, the image was exported to Photoshop. In Photoshop, the green cast from the hydrogen frames was muted to a gold color and the blue color from the oxygen frames was shifted toward turquoise. After that, the image was slightly sharpened using a highpass filter before exporting back to PixInsight. The image with included stars was then reconstructed by screening the stretched star image with the Photoshop processed, starless image. Next, a curves transformation was used to increase overall color saturation and contrast. The last step was to use a histogram transformation to adjust the black point of the image to darken the background and the midpoint to recover some of the brightness lost by darkening the background.

Even though the same steps were used to process the two images, slight differences in how the tools were applied resulted in the differences seen in the final pictures.

Looking forward, the next new moon weekend will include an annular solar eclipse. I plan to take images, but only from our usual dark site, so I will only have a partial eclipse to shoot. For those in the US that are interested, the eclipse will take place on Saturday the 14th. If you do partake, make sure you use suitable eye protection. [Where & When | 2023 Annular Eclipse – NASA Solar System Exploration](#)

Until next month, clear skies!

*Ron Ugolick*

<https://www.astrobin.com/users/rucddu/>



## The Annular Eclipse of October 14, 2023

I'd been so focused on next year's total solar eclipse that spring was halfway over before I realized that there was going to be an annular eclipse this fall. Not only that, but the path of annularity would slash right through central Utah, where I usually go to hunt for dinosaurs. But by the time I wised up, all of the hotels in Utah were either booked up or charging ruinous prices. I looked farther east, and found affordable lodging in Gallup, New Mexico. So that became the base camp for my family's eclipse expedition.

We drove to Gallup on Friday, October 13. It was a long drive, but a beautiful one. We stopped for gas in Kingman, Arizona, and some high, thin cirrus clouds produced the best solar halo and sun dogs that I've ever seen. The forecast for October 14 in northwestern New Mexico was originally partly cloudy, but by the evening before the forecast has cleared out.

The day dawned clear and cold – at least, cold by Southern California standards. We headed north on US 491, to a point about halfway between Newcomb and Shiprock. I'd originally planned to meet up with fellow PVAA member Frank Nelson, who had a spot picked out bang on the centerline. Just a few miles short of that spot we came across Little Water, New Mexico, which seemed to consist entirely of one gas station and a house some way in the distance. The gas station had a convenience store and restrooms, it was only about six miles from the centerline of the eclipse, and a gaggle of other eclipse chasers was already setting up there to observe. We decided to stay there in Little Water and take advantage of having snacks, drinks, and a restroom close to hand.

For observing the eclipse we had eclipse glasses and a small telescope with a Sun Funnel. I'd built my first Sun Funnel back in 2012 for the annular eclipse that cut across the desert southwest that May. After 10 years, a total eclipse, and transits of Venus and Mercury, that original Sun Funnel was old, dusty, and falling apart. I discarded it when I moved households this spring. Fortunately they're easy and inexpensive to build, and I got the new one together and tested in the back yard a couple of days before go time.

We shared the observing field with about twenty other amateur astronomers, who had come from Southern California, Arizona, New Mexico, and Colorado – the most distant being from Crestline, California, and Denver. Other observers at the site had filtered binoculars, hydrogen-alpha refractors, and a computerized 10-inch Newtonian with an eyepiece camera sending live images to a laptop. We all shared views through our setups. My little reflector and Sun Funnel were pretty popular, especially for observing Baily's Beads – detached points of light formed by sunlight streaming through valleys on the limb of the moon – at the start and end of annularity. The skies were clear and the cool air made for pleasant viewing, since we were all sitting or standing in the sun for the better part of two hours. We did notice that it got distinctly cooler for a few minutes on either side of annularity, which is an effect I'd only experienced before with a total eclipse.

All too soon the show was over and it was time to get back on the road. We drove northeast to Monument Valley, and spent Saturday evening in Flagstaff, before coming home on Sunday. All in all it was a great trip, and it's already got me looking forward to future eclipses.

*Matt Wedel*



Solar halo and sun dogs from Kingman, Arizona, late in the afternoon on Friday, October 13.



The observing field at Little Water, New Mexico. The silver SUV with the open hatch in the center is the Wedelmobile.



My 4" reflector with the Sun Funnel and a mustard bottle sun-finder – when a dot of sunlight shines on the center of the bottom of the bottle, the scope is pointed at the sun!





The Adams-Wedel party at annularity:  
Aidan, Jenny, London, and Matt.



Baily's Beads at third contact. At the end of annularity, mountaintops on the edge of the moon stuck up past the edge of the sun, while sunlight still streamed through the valleys, created the broken dots of light known as Baily's Beads.

## Another Look - October 2023

### Cassiopeia

The new moon In November is on 11/13 at 0127 PST.

The full moon is on 11/27 at 0116 PST.

November is the Full Beaver Moon. Other Native American names include the Deer Rutting Moon, the Digging/Scratching Moon, the Freezing Moon and the Whitefish Moon.

We also have the First Snow Moon, the Little Winter Moon and in Great Briton, the Moon before Yule.

There are two lunar occultations this month. Neither of which is visible In the US. Venus will be occulted on 11/09 beginning at 0058 PST. Its totality extends from Greenland through Europe, so we should get a nice close approach. On 11/28 is a daytime eclipse of  $\beta$  Tauri beginning at 0840 PST. Totality is in the South Pacific and Chili.

In French Its Pleine Lune de Novembre, In German, November Vollmond, in Spanish its Noviembre Luna Llena and in Greece its Νοέμβριος Πανσέληνος, Νοέμνριος Pansélinos



Cassiopeia by Helvius

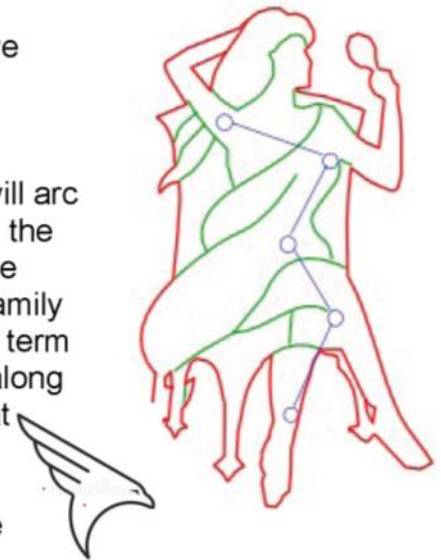
### Cassiopeia

That starr'd AEthiop Queen that strove  
To set her beauty's praise above  
The Sea-nymph  
Milton "Il Peneros

Over the next months, a family of related constellations will arc across the night sky. There is Cassiopeia, the Queen, Cepheus, the King, Andromeda, the Princess, Perseus, the Hero, Pegasus, the Flying Steed and Cetus, the Sea Monster, all part of the same family of legends. Cassiopeia is the Queen of Aethiopia, a generalized term for inhabitants of that part of Africa above the great desert and along the Red Sea, the beginning of the end of the known world at that

time. Beautiful and vain, she is typically shown seated on a throne, legs crossed, holding her long hair in her right hand and a sheaf of wheat in her left; although through time and artist, the images vary. She claimed she was more beautiful than the sea

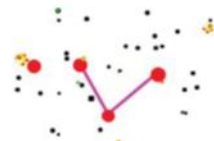
nymphs and even compared her beauty to the goddess Juno. Well, you can just imagine how they took that. So, this guy Nereus has 50 daughters, all nymphs, and they came down on him all at once. Worse, one of those daughters, whose name was Amphitrite, was married to the sea-god Poseidon. Wonder what that wedding cost and he had another 49 to go? Poseidon agrees to wack this kingdom to appease his wife and sisters-in-law. He sends a sea monster, Cetus, to ravage the coast of Aethiopia and eat the populace. The legends then begin to blend. Cassiopeia and Cepheus, following the advice of an Oracle, chain their daughter, Andromeda, to a rock as an appetizer for Cetus to appease the gods and Nereides. Perseus, the hero, flies to save her, killing Cetus and winning Andromeda for his bride.



Centuries earlier, Greece saw the asterism as the "Laconian Key":

*Not many are the stars nor thickly set  
That, ranged in line, mark her whole figure out.  
But like a key that forces back the bolts  
Which kept the double door secured within  
So shaped her stars you singly trace along.* Aratos

The Eskimos imagine that  $\alpha$ ,  $\beta$ , and  $\gamma$  Cassiopeiae, three stars forming an isosceles triangle, represent the three stones supporting a celestial stone lamp. They call the constellation "Ibrosi" ..



In other countries, the Arabians called Cassiopeia, "Al Dhat al Kursiyy", the Lady in the Chair, but earlier had one of her hands tattooed with henna. Other Arab designations includes two dogs or a deer made out the stars of Cassiopeia and Cepheus. To the Celts and the early Brits, she was the house of Don, the king of the fairies and to the Chinese, a Charioteer.

That one  
White stain of light, that single glimmering yonder,  
Is from Cassiopeia, and therein  
Is Jupiter—

In Persia, she was drawn as a queen holding a staff with a crescent moon in her right hand, wearing a crown, accompanied by a kneeling dromedary. In India, she is a princess and her story is also of a beautiful victim and a hero to rescue her.

In ancient Egypt. The W asterism, which has through history depicted a chair, may have been seen as the throne of Osiris and, also, in the Egyptian "Book of the Dead", it was called the "Leg":

*"Hail, leg of the northern sky in the large visible basin."*

One school of thought claims the original story of a queen is from Phoenicia, holding a sheaf of wheat, from at least 3500 years ago; or the Assyrian Lady of the Corn, 4000 years ago, and still others have her sharing responsibly with Virgo for the seed, the grain and the harvest.

There is a lot of great stuff in Cassiopeia. Burnham lists 74 variable stars and 151 double and multiple stars. He also lists 26 open clusters, 6 diffuse nebula, 2 planetary nebula and 3 galaxies. Cassiopeia also has 199 stars 7<sup>th</sup> magnitude and brighter, 20 of which are brighter than 5<sup>th</sup> magnitude. She has over 200 binocular and deep sky objects and several of her planetaries are in the 14+ range

Cassiopeia is an ideal constellation to get your feet wet in observational astronomy. It is a great constellation to use to gain some experience with our 4.25 and 6 inch reflectors, 3 inch refractor's and 7x50



binoculars. With these optics, we can reach 11<sup>th</sup> or 12<sup>th</sup> magnitude

The two Messier's in Cassiopeia are M52, the right hand image and M103, the left hand image. They are both open clusters, both bright at 6<sup>th</sup> and 7<sup>th</sup> magnitudes, though on opposite sides of the W. In the same field as M103 is NGC 7635, the Bubble Nebula. It is 10<sup>th</sup> magnitude, so it will be visible in your scope.

If you have, or if you can borrow a "UHC" that is an Ultra High Contrast filter, the Bubble will be more visible. The Bubble and M103 are also great targets of your Equinox type telescope/camera.

There are six Caldwell objects in Cassiopeia. Caldwell objects were compiled by a British gentleman named Patrick Moore who thought he would put together a list to place beside Messier; additional bright objects easy for the amateur to spot. In Cassiopeia, he listed 3 open clusters, 2 "dwarf spherical galaxies" and C11, which you have already met next to M103. Caldwell 8 and 10 are a little fainter open clusters along the line between delta  $\delta$  and epsilon  $\epsilon$ , the flat arm of the W. Learn

your Greek alphabet, it will make your life easier. C8 is the right hand image, about 9<sup>th</sup> magnitude and C10 is the left image, magnitude 7. C13 is quite pretty, easy to find and bright at 6<sup>th</sup> magnitude.

C13 by <https://ocastronomers.org/wp-content/uploads/2018/12/NGC457-m25-15x340s-011s.jpg>

M52&103 by [https://ocastronomers.org/wp-content/uploads/2018/12/Buble-Nebula-and-M-52-LRGB\\_.jpg](https://ocastronomers.org/wp-content/uploads/2018/12/Buble-Nebula-and-M-52-LRGB_.jpg)

and M103oc\_ <https://ocastronomers.org/wp-content/uploads/2019/01/m103.jpg>

C8, NGC 559 by William Maxwell [https://www.astrobin.com/vm6jg7/?q=ngc 559](https://www.astrobin.com/vm6jg7/?q=ngc%20559)

C10, NGC 663 by Dr. Dimitrii Paniukov [https://www.astrobin.com/nnv1vb/?q=ngc 663](https://www.astrobin.com/nnv1vb/?q=ngc%20663)



C17 and C18 are completely different animals. Known as NGC 147 and NGC 185, left to right in the image, they are dwarf galaxies, members of the Andromeda galaxy family, but should be objects you can find.

Dwarf galaxies are cool, usually close to us, usually a little weird and odd shaped and usually with low surface brightness. That means that a 9<sup>th</sup> magnitude galaxy is spread across your field of view. Looking out of the corner of your eye, we call that averted vision, will help the image pop into view. Additionally, these two galaxies are only 10 minutes of arc apart, you might be able to pick both out in the same field, like this great astrophotograph by Hannes Bachleitner @ [https://www.astrobin.com/oc4oj7/?q=ngc 185](https://www.astrobin.com/oc4oj7/?q=ngc%20185).




While in that area, close to C17 and 18 is NGC 278, also a satellite galaxy of M31, the Andromeda galaxy. NGC 278 is 11<sup>th</sup> magnitude, maybe at the limit of your scopes ability, but, a full face on spiral with sort of fluffy spiral arms.

<https://www.astrobin.com/52t9o0/E/?nc=all>



This month, Cassiopeia is between us and the north pole, meaning if you stand looking north, the Milky Way runs left to right, we see Cygnus and Lyra to the west and Cassiopeia

is in her lopsided  **M** shape. The bottom

right hand star as we see it is epsilon  $\epsilon$ , whose name is Segin. Segin is a nice whitish 3<sup>rd</sup> magnitude star that I want you to use as a placeholder. A couple of telescope fields to the right (east) of Segin are two beautiful nebula/cluster objects called the Heart and Soul nebula. They are 6<sup>th</sup> magnitude, so you will find them with ease. If you still have that UHC filter, be sure to use it.

Check out APOD for February 14, 2023; IC's 1848 & 1805 are the featured image. Challenge yourself a little and try to pick out a few of the objects associated with these two nebula. Clustered around the Heart is Markarian 6, IC 1795, the Fish Head, IC 896 and IC 1027. Around the Soul are IC 1871 and Collinder's 33 & 34. Use your star chart as a guide. If you would like a good one, free, you can download Deep Space Hunter Atlas at:

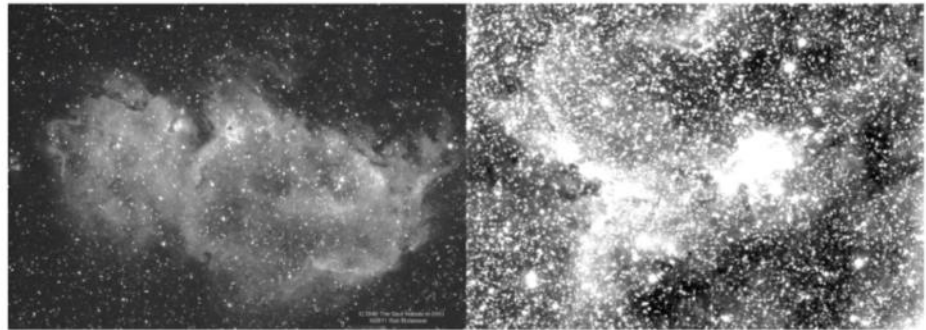
<https://www.deepskywatch.com/deep-sky-hunter-atlas.html>. Good Hunting

<https://ocastronomers.org/wp-content/uploads/2018/12/Final-IC1848-The-Soul-Nebula-in-SHO-Narrowband-1200.jpg> / [https://ocastronomers.org/wp-content/uploads/2018/12/IC-1805-R\\_195m\\_G\\_143m\\_B\\_88m.jpg](https://ocastronomers.org/wp-content/uploads/2018/12/IC-1805-R_195m_G_143m_B_88m.jpg)

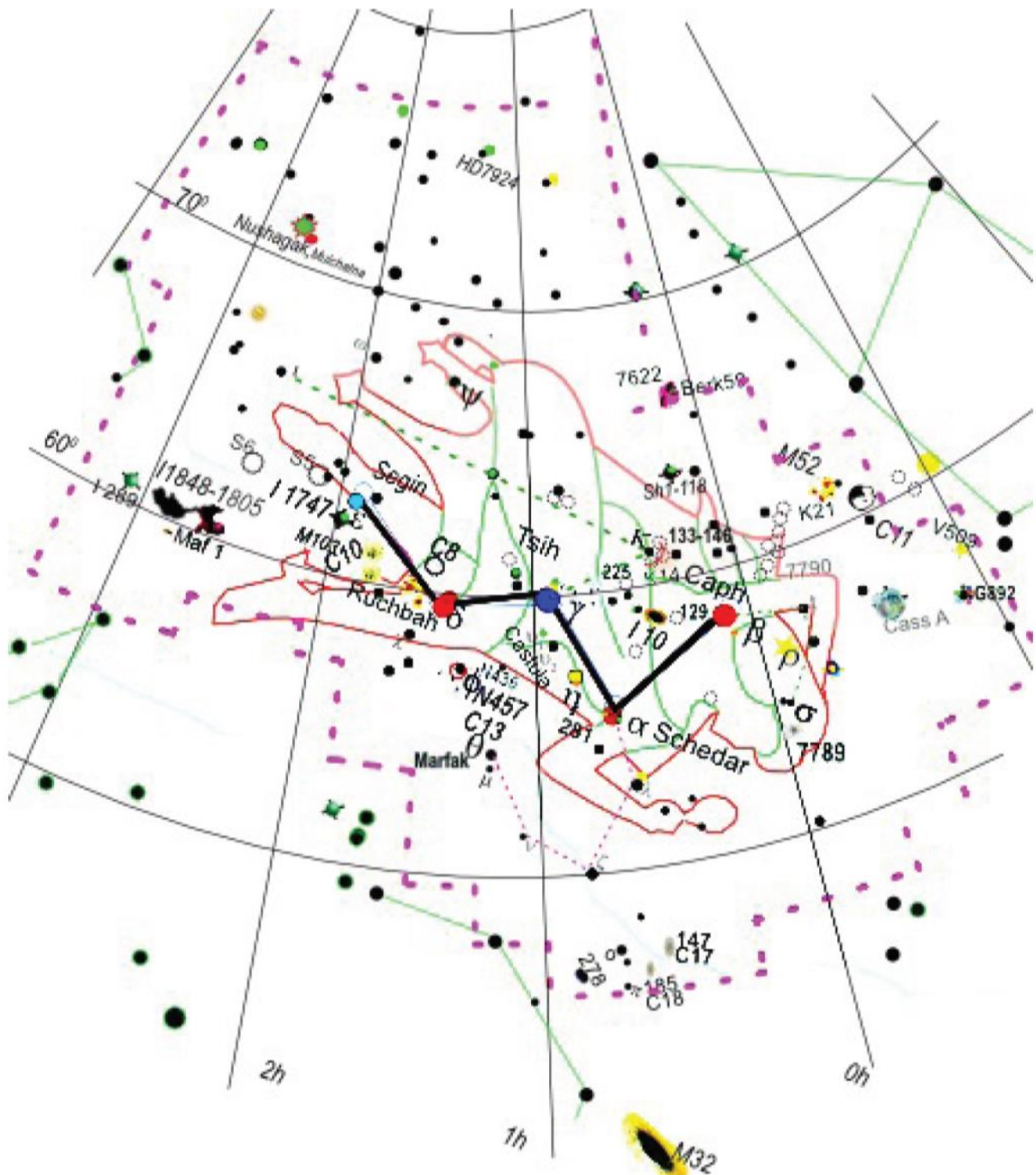
There are many fine books out there for the novice and even the expert astronomer. Look for *Deep-Sky Wonders* by Walter Scott Houston. You can find a PDF version online. Scotty had a lot of recommendations for the middle of November, many of which are already listed. Study the chart and look for a stream of open clusters flowing away from  $\beta$ , named Caph, on the other side of the **M**. These OC's are 7790, 7788 Frolov 1, Berk 58, Harvard 21 King 12 and King 21. All together they are quite a sight.

Then look for open clusters around  $\beta$ ,  $\gamma$ , and  $\kappa$ . NGC's 129, 133, 225 and 146. Above the center of the **M**, near Caldwell 13 is a partner cluster, NGC 436. Caldwell 13's IAU name is NGC 437. The top star on the **M** is  $\alpha$  and very close is another nice open cluster nick-named the "Pacman". Over by  $\rho$  (rho) is "Caroline's Rose", NGC 7789. Named after the great Caroline Herschel, the Rose is a very rich open cluster, with lanes and spirals visually but resembling in astrophotos a loose globular.

<https://www.astrobin.com/134259/?q=ngc 7789>



Going across the top of the M from right to left the names of the stars are Segin, Ruchbah, Gamma, sometimes called Navi, Schedar and Caph. Gamma  $\gamma$  is very interesting. It has 3 companions, only one of which can be seen, but D, the third of the companions has 3 companion of its own. In China, gamma's name is Tsih, the Whip. North in Cassiopeia is Nushagak. Nushagak is an Alaskan name for an 8<sup>th</sup> magnitude star with a very large planet named Muchatna. Nushagak is a river in Alaska and Mulchatna is one of its tributaries. A little further north in Cassiopeia is a star named HD 7924. It is kind of orangish and has three planets, all in the habitable zone. BASA has a lot of interesting things to say about HD 7924b, a huge extrasolar planet.



You will find it a very satisfying if you decide to search for the supernova remnant Cassiopeia A. It is quite famous and should be visible in your 6 inch with really dark sky's. Sky and Telescope magazine published one astronomer's search for Cass A. at <https://skyandtelescope.org/observing/cas-a-supernova-remnant/>

Last month, on October 14, the National Park Service held the annual Night Sky star party at Sky's the Limit in Joshua Tree. 500 people were registered and it seems like most of them peeked through my little 60mm refractor at Jupiter and the Pleiades. We had astronomers from Riverside, San Diego, Temecula, Los Angeles, Orange County, Tucson and one even flew in from Singapore. Visitors came from all over the US, and, a fine time was had by all. I just want to say thank you and  
Dark Skys

*Dave Phelps*

**Holiday Party Announcement**

December is almost here, and you know what that means, the big annual PVAA Holiday Party! This year the party will be on Saturday, December 2<sup>nd</sup> at Casa Jimenez on Foothill Blvd. in Claremont. We will meet at 6:00 PM.

Besides good food and plenty of camaraderie the festivities will include a drawing with numerous door prizes. The **grand prize** will be a **\$50 gift certificate** from Woodland Hills Camera and Telescopes. But even if you don't win the grand prize, don't worry. Everyone will win something in the drawing. No one goes home empty handed.

*Ron Hoekwater*

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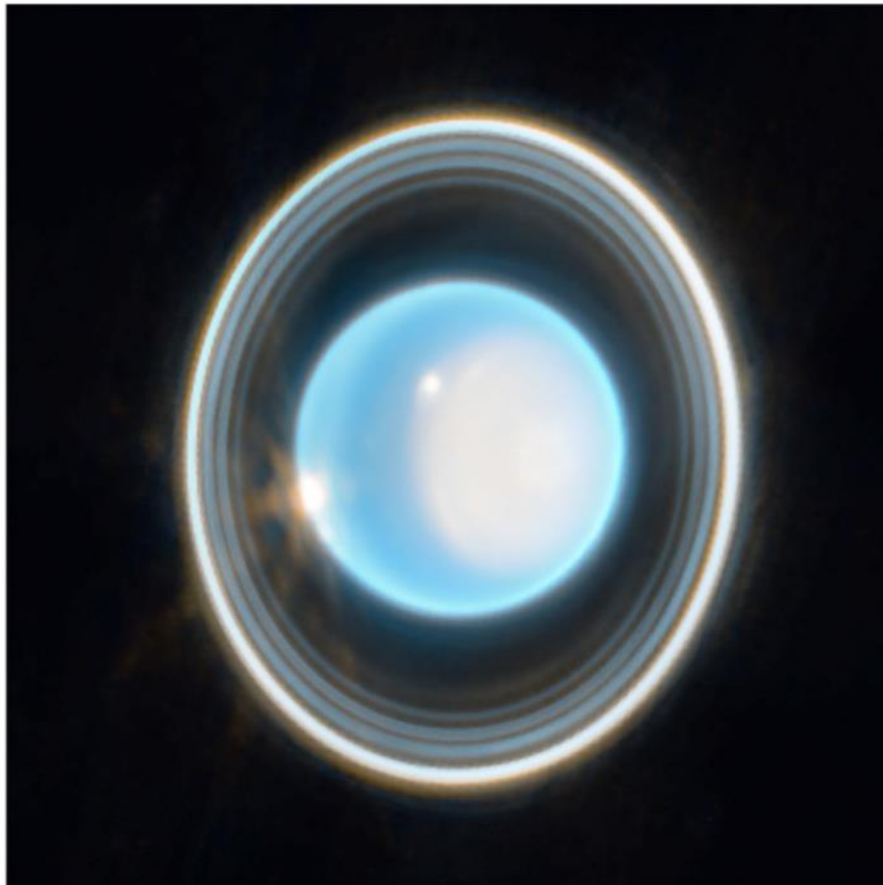


**This article is distributed by NASA's Night Sky Network (NSN).**

The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit [nightsky.jpl.nasa.gov](https://nightsky.jpl.nasa.gov) to find local clubs, events, and more!

## Spy the Seventh Planet, Uranus

By Liz Kruesi



You might be familiar with Saturn as the solar system's ringed planet, with its enormous amount of dust and ice bits circling the giant planet. But Uranus, the next planet out from the Sun, hosts an impressive ring system as well. The seventh planet was the first discovered telescopically instead of with unaided eyes, and it was astronomer extraordinaire William Herschel who discovered Uranus March 13, 1781. Nearly two centuries passed before an infrared telescope aboard a military cargo aircraft revealed the planet had rings in 1977.<sup>1</sup>

Since that discovery, multiple observatories have revealed more details of Uranus and its ring system. Most recently, the NASA-led JWST space observatory captured the planet and its rings in detail. This recent image combines just 12 minutes of exposure in two filters to reveal 11 of the planet's 13 rings. Even some of the planet's atmospheric features are visible in this image.

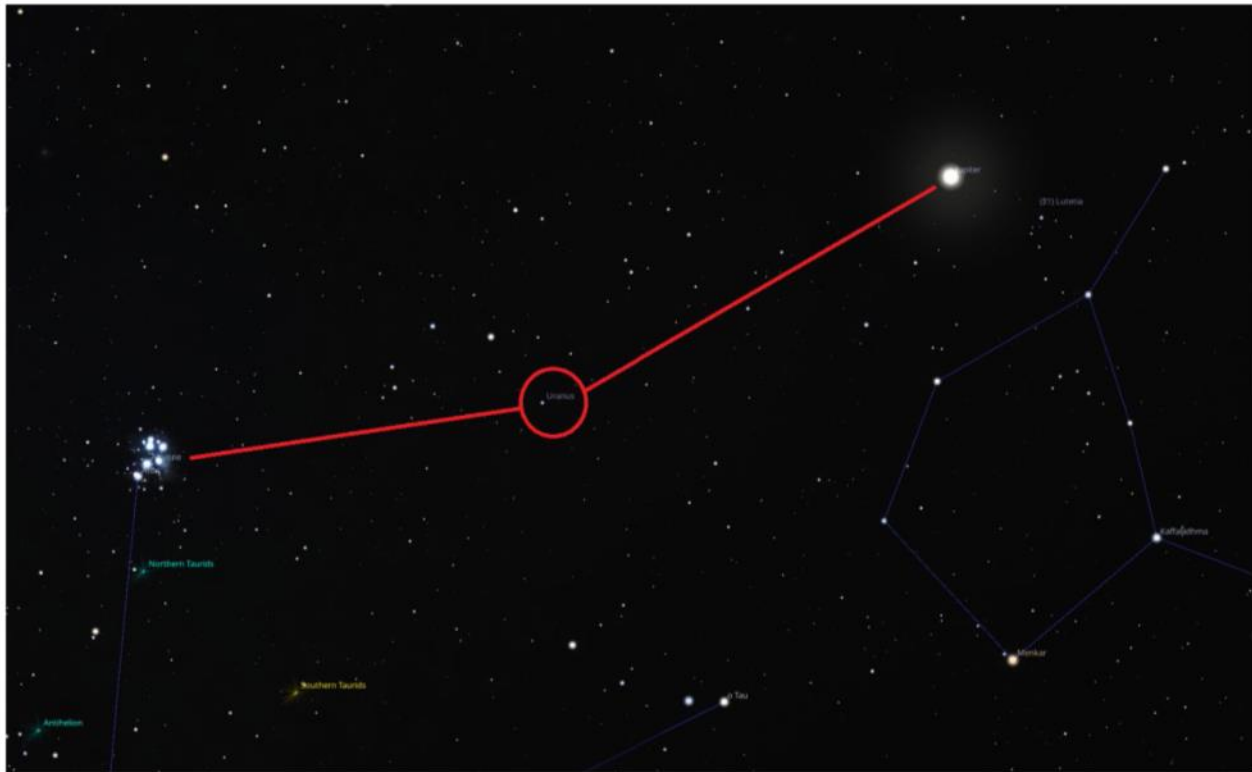
<sup>1</sup> For more about the infrared scope,

[https://web.archive.org/web/20230429120852/https://www.nasa.gov/vision/universe/watchtheskies/kui\\_per.html](https://web.archive.org/web/20230429120852/https://www.nasa.gov/vision/universe/watchtheskies/kui_per.html)



Even with advanced imaging like that from JWST, much of Uranus remains a mystery, including why it orbits the Sun on its side. This is because only one spacecraft has ever visited this planet: NASA's Voyager 2, which flew by the distant planet in the mid-1980s.<sup>2</sup>

Planetary scientists are hoping to change that soon, though. Scientists recommended in a [report](#) released last year from the National Academies of Sciences, Engineering, and Medicine that Uranus be the focus on the next big planetary science spacecraft mission. Such a large-scale mission would gain insight into this icy giant planet and the similar solar system planet, Neptune.

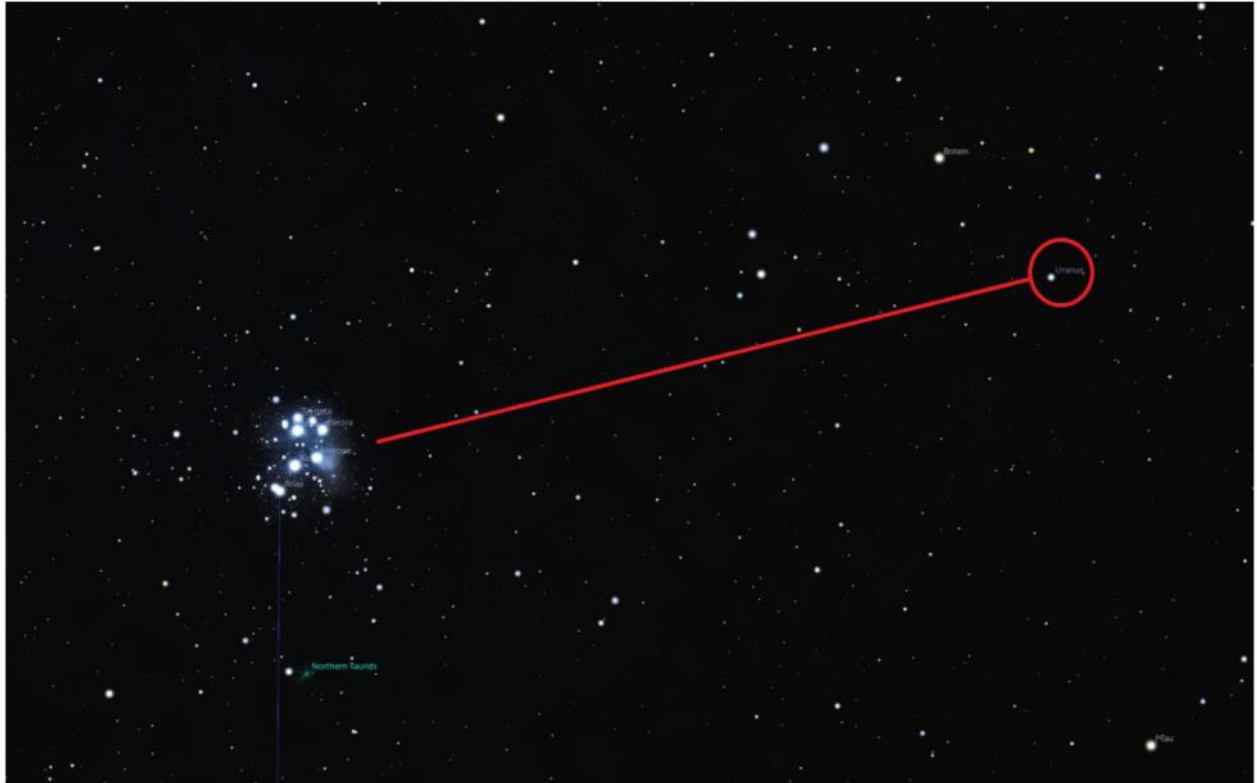


*Sky map picturing M45, Uranus and Jupiter, Stellarium*

If you want to catch a view of Uranus with your own eyes, now is prime time to view it. This ice giant planet lies perfectly positioned in mid-November, at so-called "opposition," when its position in its orbit places it on the other side of the Sun from Earth. That location means our star's light reflects off Uranus' icy atmosphere, and the planet appears as its brightest.

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<sup>2</sup> See more about the flyby at <https://www.nasa.gov/history/35-years-ago-voyager-2-explores-uranus/>



*Sky map picturing M45 and Uranus, Stellarium*

To find it, look overhead just after midnight on November 13. Uranus will lie about halfway between the brilliant planet Jupiter and the diffuse glow of the Pleiades star cluster (M45). While Uranus may look like a bright blinking star in the night sky, its blue-green hue gives away its identity. Binoculars or a telescope will improve the view.

For more about this oddball planet, visit NASA's [Uranus page](#).

Image 1:

Uranus hosts 13 faint rings, 11 of which are visible in this JWST image. The planet was 19.67 times the Earth-Sun distance from our planet (1.83 billion miles) when JWST captured exposures through two near-Infrared filters on February 6, 2023. The white region in the right side of Uranus is one of the planet's polar caps. This icy world orbits the Sun differently from the rest of the solar system's planets – Uranus rolls along on its side.

[NASA, ESA, CSA, STScI; Image Processing: Joseph DePasquale (STScI)]